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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,021	03/02/2004	Jei-Wei Chang	HT98-034CB	1282

7590 08/23/2004
George O. Saile
28 Davis Avenue
Poughkeepsie, NY 12603

EXAMINER

LAVILLA, MICHAEL E

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 08/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/791,021	CHANG ET AL.	
	Examiner	Art Unit	
	Michael La Villa	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>20040415</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:
2. The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
3. Claims 1-17 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Omission of elements, critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).
Applicant, in applicant's Summary of the Invention section and the Table, emphatically states that a buffer layer, having lattice constant and type matching those of the free layer, is a key element in each embodiment of the invention. However, these relationships are not claimed. Hence, the claims, failing to recite these matching properties, do not satisfy section 112, first paragraph.
4. The following is a quotation of the second paragraph of 35 U.S.C. 112:
5. The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
6. Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
 - I. Regarding Claim 1, it is unclear what is meant by the reference "18" in the penultimate line.

- II. Regarding Claim 4, line 3 and Claim 17, line 3, it is unclear what is meant by the phrase "said a non-magnetic conductor spacer layer". Is "a" superfluous? Is this layer different from the layer of the same description previously recited in Claim 1?
- III. Regarding Claim 8, it is unclear whether the recited materials are alternative choices or simultaneously present.
- IV. Regarding Claim 14, line 1, it is unclear what is the antecedent basis of the phrase "spin filtering giant magnetoresistive (GMR) sensor element".
- V. Regarding Claim 16, it is unclear what is meant by the phrase "further includes". What is added to the recitation of Claim 15? Rather, it appears that this claim merely further limits Claim 15.
- VI. Regarding Claims 1 and 15, it is unclear what is meant by the phrase "magnetoresistive resistivity sensitivity enhancing material". Doesn't the material enhance the sensitivity of magnetoresistive effect? If so, what is the distinction that is being made by calling for resistivity sensitivity? What does this mean?

Claim Rejections - 35 USC § 102

- 7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:
 - 8. A person shall be entitled to a patent unless –
 - 9. (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1 and 7-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Kamiguchi USP 6,303,218. Kamiguchi teaches forming spin valve structures, wherein a substrate is coated with a buffer layer, base crystal layer, an iron oxide crystal growth-controlling layer, a free magnetic layer of the spin valve, and the remainder of the claimed spin valve structure. The crystal structure and lattice constants of the crystal growth controlling layer are chosen to be close to those of the base crystal layer and free magnetic layer, whose crystal structures and lattice constants are to be identical. See Kamiguchi (col. 6, lines 48-66; col. 7, lines 53-58; col. 8, lines 21-58; col. 10, lines 21-39; col. 12, lines 47-64; and Examples 2, 3-7, 26, and 27). Kamiguchi does not describe the iron oxide as having alpha structure. However, according to Kamiguchi, the iron oxide of Kamiguchi is supposed to have crystal structure and lattice constants comparable to that of the base crystal layer, which may be Ni₈₀Fe₂₀. Applicant teaches that alpha iron oxide possesses the same structure and comparable lattice constants with respect to Ni₈₀Fe₂₀. Therefore, it would be expected that the iron oxide of Kamiguchi inherently comprises alpha iron oxide.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject

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matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

13. Determining the scope and contents of the prior art.

14. Ascertaining the differences between the prior art and the claims at issue.

15. Resolving the level of ordinary skill in the pertinent art.

16. Considering objective evidence present in the application indicating obviousness or nonobviousness.

17. Claims 1-6 and 8-17 are rejected under 35 U.S.C. 103(a) as being obvious over

Horng et al. USP 6,292,336. Horng et al. exemplifies a substrate coated by forming NiCr alloy seed layer, NiO buffer layer, and NiFe free layer in a MR sensor element. See Horng (Abstract; col. 5, lines 46 through col. 6, line 37; col. 7, lines 12-32; col. 7, line 53 through col. 8, line 65; col. 9, lines 34-51; col. 10, lines 13-34; col. 12, lines 37-51; and Examples). Horng teaches but does not exemplify the claimed structures of a seed layer of the claimed materials, NiO buffer layer, an optional spacer layer, free layer, spacer layer, pinned layer, antiferromagnetic layer, and cap layer or making of such structures, as effective spin valve devices. Horng also teaches that effective spin valves may comprise a pinned layer of the claimed three-layered variety. It would have been obvious to one of ordinary skill in the art at the time of the invention to fabricate the structures suggested by Horng by forming on NiO an optional spacer layer, a free layer, a spacer layer, a pinned layer, an antiferromagnetic layer, and a cap layer,

as Horng teaches that the resulting laminates form effective spin valve devices. It would have been obvious to one of ordinary skill in the art at the time of the invention to fabricate said structure with a three-layered pinned layer as Horng teaches that effective spin valves may obtain this structure. While Horng does not explicitly teach the claimed requirement of lattice and structure matching between the buffer metal oxide layer and the free layer, the materials utilized by Horng are identical to applicant's preferred NiO and NiFe materials that achieve applicant's desired matching.

18. The applied reference has a common inventor with the instant application.

Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject

matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(I)(1) and § 706.02(I)(2). J.W. Chang appears to be a common inventor.

19. Claims 4, 5, and 7-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiguchi USP 6,303,218. Kamiguchi teaches forming spin valve structures, wherein a substrate is coated with a buffer layer, base crystal layer, an iron oxide crystal growth-controlling layer, a free magnetic layer of the spin valve, and the remainder of the claimed spin valve structure. The crystal structure and lattice constants of the crystal growth controlling layer are chosen to be close to those of the base crystal layer and free magnetic layer, whose crystal structures and lattice constants are to be identical. See Kamiguchi (col. 6, lines 48-66; col. 7, lines 53-58; col. 8, lines 21-58; col. 10, lines 21-39; col. 12, lines 47-64; and Examples 2, 3-7, 26, and 27). Kamiguchi does not describe the iron oxide as having alpha structure. However, according to Kamiguchi, the iron oxide of Kamiguchi is supposed to have crystal structure and lattice constants comparable to that of the base crystal layer, which may comprise Ni₈₀Fe₂₀. Applicant teaches that alpha iron oxide possesses the same structure and comparable lattice constants with respect to Ni₈₀Fe₂₀. Therefore, it would be expected that the crystal growth-controlling layer comprises alpha iron oxide. In the event that the exemplified laminates do not contain particularly claimed materials and thicknesses, it would have been obvious to one of ordinary skill in

the art at the time of the invention to use any of the claimed magnetic and conductor layer materials of the claimed thicknesses as Kamiguchi teaches using such materials and thicknesses as effective for forming magnetic sensor elements. It would have been obvious to one ordinary skill in the art at the time of the invention to use a synthetic pinned layer as claimed in the laminate of Kamiguchi as Kamiguchi teaches that spin valves having such synthetic pinned layers are effective.

Conclusion

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael La Villa whose telephone number is (571) 272-1539. The examiner can normally be reached on Monday through Friday.
21. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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22. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael La Villa
13 August 2004

A handwritten signature in black ink, appearing to read 'La Villa', with a stylized flourish at the end.